NAUTICUS

RELEASE DOCUMENT

NAUTICUS HULL

NAUTICUS 3D BEAM

CONTAINER SECURING

FPSO PACKAGE

PULS

JANUARY 2006

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DNV SOFTWARE

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1 Introduction

1.1 Purpose

The purpose of this document is to inform the users about system requirements, installation process, new programs and enhancements/bug fixes that are implemented since last release. In this release, several modifications and corrections has been implemented to better support the official IACS Common Structural Rules for Double Hull Oil Tankers (also called "JTP Rules").

For detailed information on new and existing features, please see the updated on-line User Manuals.

For information on new features, known errors and limitations in the SESAM programs please refer to the SESAM Status Lists for each program.

Important Note:

All users using a Nauticus Hull server license (floating license) must update the DNVS License Manager on respective server. To support USB dongle functionality, the Flexlm license manager has been updated.

For information on how to install the program, please read the **Nauticus Hull Installation Guide.pdf**, which can be found on the root of the installation CD.

2 Programs and versions

2.1 Nauticus Hull Rule Check, Pck I

- Nauticus Project Manager 9.87
- Section Scantlings 9.87
- Fatigue 9.87
- Rudder 9.87
- Cross Sections 9.87
- Rule Check XL 9.87
- PULS 2.05

2.2 Nauticus Hull Rule Check, Pck I Extended

- Nauticus Hull Rule Check, Pck I
- 3D-Beam 9.87

2.3 Nauticus High Speed Light Craft (Nauticus HSLC)

- Section Scantlings 9.87
- Cross Sections 9.87
- HSLC XL 9.87

2.4 Nauticus HSLC Extended

- Nauticus HSLC 9.87
- 3D-Beam 9.87

2.5 Nauticus Container Securing

- Container Securing 9.87

2.6 PULS

- PULS Advanced Viewer 2.06
- PULS Excel 2.06

2.7 Nauticus Hull Basic, Pck II

- Nauticus Hull Rule Check, Pck I Extended
- Nauticus HSLC, Extended 9.87
- Modeller 9.87
- 2D Modeller 4.01

2.8 Nauticus Hull FEM analysis, Pck III

- Nauticus Hull Basic, Pck II
- Idealiser 9.87

SESAM modules:

- MANAGER
- Patran-Pre (separate CD)
- PRESEL
- SESTRA
- CUTRES
- SUBMOD

- XTRACT-STRU
- Misc. SESAM Utility Programs

Go to http://www.dnv.com/software/support/index.asp >> SESAM Status List, for latest versions of SESAM modules.

2.9 Nauticus Hull Wave Load Analysis, Pck IV

- Nauticus Hull FEM Analysis, Pck III

SESAM modules:

- WAVESHIP
- WASIM
- WASIM_setup
- WASIM_solve
- WASIM_fourier
- WASIM_stru
- WASIM_mass
- POSTRESP
- POSTRESP Fatigue ext.
- XTRACT-ANIMATION

Go to http://www.dnv.com/software/support/index.asp >> SESAM Status List, for latest versions of SESAM modules.

2.10 Nauticus Hull Sea Keeping Analysis

SESAM modules:

- MANAGER
- WAVESHIP
- WASIM
- POSTRESP
- XTRACT-ANIMATION
- Misc. SESAM Utility Programs

Go to http://www.dnv.com/software/support/index.asp >> SESAM Status List, for latest versions of SESAM modules.

3 System Information

3.1 Minimum software requirements

Microsoft Office 2000, Excel + Word, Internet Explorer 5.01, or later versions.

3.2 Minimum hardware requirements

Package	Processor CPU/Mhz	Memory MB	Storage GB	Display and Graphics card
Hull Rule Check FPSO Rule Check 3D Beam HSLC Container Securing	200	128	2	SVGA 256 colours 1024x768 resolution
Basic Ship Modeller Finite Element Analysis Wave Load Analysis Sea Keeping Analysis FPSO Initial Design PULS Advanced Viewer	400	512	10	SVGA 16.5 million colours 1024x768 resolution OpenGL hardware accelerator recommended

3.3 Operating system requirement

Windows NT 4.0 with Service Pack 6, Windows 2000 with Service Pack 4 or Windows XP.

3.4 Decimal Separator

Decimal separator (symbol)

It is required to use **.** (dot) as decimal separator for the Nauticus Hull programs.

Open Control Panel → *Regional Settings* to inspect and modify the separator symbols.

If changing Decimals Symbol sign given in regional setting from what is default for selected country, change Decimal Symbol both for numeric and *currency* values. Otherwise, the RCXL spreadsheets may produce wrong result.

List separator

List separator sign must be different from the decimal separator used. Use comma **,** or semicolon **;**

4 Program Updates

4.1 General

This section describes the most relevant program updates done since the September 2005 release. The major update is that all programs are now updated according to the final version of IACS Common Structural Rules for Double Hull Oil Tankers (hereafter named "CSR-Tank"). In addition, several bug fixes and program enhancements has also been implemented. Last, several new tools have been implemented, including new RuleXL tools supporting CSR-Tank and a brand new tool for Stochastic Fatigue.

4.1.1 Job templates

1) **New Job template: "CSR - Tank January 2006"**
   - The new template contain the following nodes:
   a. Cross-section Analysis
   b. Transverse Bulkhead Analysis
   c. Materials and Welding
   d. Loads
   e. Buckling and Ultimate Strength
   f. General Tools

4.1.2 Tutorials

1) **The following tutorials are now included as a part of the Documentation in Nauticus Project Manager:**

   -Nauticus Hull Jan 2006 Fatigue Tutorial

   - Nauticus Hull Jan 2006 Tvbhd Tutorial

   - Nauticus Hull Jan 2006 RuleSca Tutorial

4.1.3 Section Scantlings

A. CSR Tank

The program has been updated according to cover an extensive set of the Final Rule revision. The Rules are applicable for double hull oil tankers with length L > 150 m, and Section Scantlings includes support for those Rules for cross-sections in the entire cargo area.

The main remaining issues to fully support CSR-Tank Final Rule revision:
- Calculations for vertically corrugated transverse and longitudinal bulkheads are not fully implemented.
- Appendix A/2.2, H-ULS according to "Simplified Method Based on an Incremental-iterative Approach" is not fully implemented.

B. Section Scantlings – Changes since the September 2005 version

1) **Updated buckling calculations**
   The buckling check of plates and stiffeners has been updated according to the Final Rule revision. In the local Rule requirement tables for plates and stiffeners, the buckling strength results on the BUC line have been changed accordingly.

2) **Report Options dialog**

In the "Rules to be applied" group, the selection of the relevant Rules is now more specific than before. Select between the following options:
- IACS Common Rules for Oil Tankers
- DNV Rules for ships
- Use no Rules

3) **Other updates related to the Final Rule revision**
   - Section 7/3.4.3.1: The coefficients 0.45 and -0.45 in the formulae have been changed into 0.3 and -0.3,respectively.
   - Section 7, Table 7.6.4 and 7.6.5: The dynamic load case 4 has been removed. The subsequent load cases 5a,.., 8b have been renumbered into 4a,..,7b.
   - Section 6.3: revised net scantlings definitions
4) **Heating coils in tanks can now be specified in cargo tanks.**
   -This will increase the corrosion addition for the plates in way of that tank
5) **For ballast tanks, it may now be specified whether the tank is designed for ballast water exchange (BWE) by flow-through method.**
   -The pressure in such cases will be higher than for tanks without the BWE option.
6) **Transverse bulkheads**
   - For plane transverse bulkheads, the Final Rule revision has now been included in the program.
7) **Error correction**
   -For sections within 25% of the tank length from the tank ends, the local requirements for some plates and stiffeners became too small in areas where the sloshing pressure was higher than the pressure in the full tank. If the pressure in a full tank is lower than the sloshing pressure, it may well give a higher requirement to the plates and stiffeners than the sloshing pressure does.
8) **Known error**:
   -When working with projects located on another directory than the local i.e. on a server, deleting cross-section causes software crash.
9) **User manual**
   - The User Manual has been updated to document all data in the reports, including report for CSR-Tank

4.1.4 Fatigue calculations in Section Scantlings:

1) **User manual**
   - The User Manual has been updated and improved
2) **Detailed report**
   - An option to generate a detailed fatigue report for the CSR-Tank calculations is now included.
3) **Colour plots**
   - The fatigue colour plot feature is extended to include fatigue damage in addition to fatigue life
   - Corrected colour for stiffeners that is not calculated for fatigue lifetime colour plot.
4) **Swash bulkheads**
   -The position-dialog for CSR-Tank is extended with check box for swash bulkheads.
5) **Kd factor for transverse bulkheads**
   - Kd factor is now included in end connection dialog.
6) **Ullage factor**
   - The ullage effect in CSR-Tank final revision, Section 7/3.5.4.5-6, is corrected for the stiffeners located at the top of the ballast tank adjacent to the cargo tank.
7) **Updated computation according to CSR change documents.**
8) **Fatigue welding class**
   - Option included for user to override fatigue welding class.
   - Corrected welding class for end connection 32 now applied.

4.1.5 Stochastic Fatigue in Section Scantlings:

1) **New tool**
   - This is the first official release of the tool Stochastic Fatigue in Section Scantlings.
2) **User Manual**
   - Separate User Manual included
3) **Bug-fixes from beta-release versions**
   - Kn removed from some loadfactors
   - Still water bending moment sign corrected
   - Fatigue life calculations corrected
4) **Support for offshore Rules**
   - Ad-hoc support for offshore rules implemented. The user may remove the mean stress effect, which may be desired according to DNV RP-C203. This is done by setting IncMeanStressCorrFactor=0 in the file nauticus.ini. Thereby, the mean stress correction factor, fm, is NOT calculated.
5) **Log-file**
   - Altered logfile name to "StochFatCalc.log" (turn ON logging, by setting WriteLogFile=1 in the file nauticus.ini)
6) **Warning**
   Warning is given if no stiffeners defined

LIMITATIONS: relative deflections and double hull bending stresses has not yet been tested thoroughly, and should be used with care!

4.1.6 Rule Check XL

1) **New Job template: "CSR - Tank January 2006"**
   - The new template contain the following nodes:
   - Cross-section Analysis
   - Transverse Bulkhead Analysis
   - Materials and Welding
   - Loads
   - Buckling and Ultimate Strength
   - General Tools
2) **New tools (Excel spreadsheets)**
   - The following new tools are included as Excel spreadsheets started from the template "CSR - Tank January 2006":
     Materials and Welding:
       CSR-Tank_Welding.xls
     Loads:
       CSR-Tank_BowImpactLoads.xls
       CSR-Tank_BottomSlammingLoads.xls
       CSR-Tank_Sloshing.xls
       CSR-Tank_PressureLocSupMemb.xls
       CSR-Tank_PressurePriSupMemb.xls

3) **Bug-fixes**
   - Various minor corrections and bug fixes i RuleCheck XL.

4.2 Container Securing

No updates in this release.

4.3 Rule Check Extended & HSLC Extended

These two packages contain the 3D Beam program in addition to the basic software.

4.3.1 PULS

1) **Name of nodes**
   - Name of "Buckling Control" tools updated to "PULS XL" and "PULS Advanced Viewer"
2) **Updates from version 2.05 to 2.06 (Puls XL and PULS AV)**

4.3.2 3D Beam

No updates in this release.

4.4 Basic (Pck II)

4.4.1 Modelling and Analysis Job

1) **Cargo hold example ShuttleCSR is a part of installation**
   - ModellingAndAnalysis.BxPkg in ShuttleCSR is an example of a 3 cargo hold model including 2D parts, modeled according to Common Structural Rules.
2) **Ability to modify commands**
   - Function for modifying "Paste 2D Part" commands implemented
   - Function for modifying "Create Hull Geometry", "Extrude Shell" and "Extrude Inner Structure" commands implemented.
3) **New command for splitting multiple faces**
   - Command for splitting multiple faces implemented
4) **Known Error**:
   -When working with projects located on another directory than the local i.e. on a server, deleting cross-section causes software crash.

4.4.2 Modeller

1) **Possible to select Starboard or Port side when idealising half model only**
   -Separate option in Idealiser dialog
2) **Outer shell faces are automatically split by CL plane during idealisation**
   -No longer necessary to create dummy cutplane in centre line when idealising
3) **Internal tank pressures for fatigue load conditions updated according to Final Rule revision of CSR-Tank.**
4) **Distribution of loads applied for shear force corrections updated according to Final Rule revision of CSR-Tank.**
5) **Load conditions according to Final Rule revision of CSR-Tank.implemented**
6) **Updated and improved User Manual for local FE idealization**
   -Found in the Documentation part of Nauticus Project Manager
7) **Memory optimization implemented size of models reduced by 15-20% (no change for ABC capacity models).**
8) **Crash when selecting Properties for outer shell plate groups is removed.**

9) **Warning is shown if not all relevant input data is given when creating CSR-Tank. load conditions.**

4.4.3 2D Modeller

1) **Corrected position of outer shell stiffeners when pasting general sections from 3D model**.

4.4.4 Automatic Buckling Check (ABC)

1) **Updated and improved User Manual, including a new chapter on Best Practice.**

   -Found in the Documentation part of Nauticus Project Manager

2) **Retrieving stresses optimization:**

   -better use of GROUP (or SET) names on FEM result file have given radically reduced time for retrieving stresses

   -Batch run: possible to run retrieving stresses + running buckling check in one go.

3) **Viewing enhancements:**

   - New axis in Viewer making it easier to orientate in 3D

   - Outlines on 3D model are shown in grey color: gives better overview

   - Graphical viewing of Von Mises stresses + usage factors implemented.

   - Improved viewing: added legends, more well arranged view options

   - New view options/filter: worst case status / usage factor status - only displaying capacity models that are not ok, i.e. panels where usage factor > allowable usage factor.

   -Improved "hanging tooltip" functionality, displaying coordinates for the selected panels.

4) **Loadcase names are now displayed (if properly exported from Patran-Pre)**

5) **Automated yield check (Von Mises) implemented: permissible usage factor based on loading condition (static / dynamic) and structure type. Results displayed in reports.**

6) **Possible to 'Cancel' operation during retrieving stresses and running buckling check**

7) **Fixed "bugs"/enhancements:**

   - instability after creating capacity models, showing save-dialog

   - Better configuration of "creating capacity models"-dialog,

   - fixed error message when exporting,

   - better status during retrieving fem stresses + running PULS.

   - corrected retrieving stresses (stress direction was in rare cases wrong**)**

   - all stress components in tension is set to zero

   - corrected strength criteria for hoppertank area + tbhd structure (now set to BS)

8) **Automatically detecting harbour and seagoing condition.**

9) **Scanning for worst Von Mises case implemented, including both graphical viewing and in standard report.**

10) **If no calculations are performed on a capacity model due to geometry requirements usage factor is now set to 999 to make it visible**

11) **Altered name of logfiles:**

-"ABC_stresses.log" (old: tmp_ntpmabcexcel.log)

-"ABC_calculations.log"(old: tmp_ntpmabcpulslc.log),

-Export file to "export_results_abc.txt" (old name: export_results_abc.log)

4.4.5 Part Library/Part Macro/Wizards

- No updates in this release

4.5 FEA ,Wave load and Sea Keeping analysis

1) **New program versions of SESAM programs**
   -New version of Xtract (1.9-10), Presel (7.4-01) and Sestra (8.2-01) included (see separate status lists) Go to http://www.dnv.com/software/support/index.asp >> SESAM Updates, for latest versions of SESAM program versions.
2) **New/improved features in Xtract that are especially relevant for ship analysis**
   - Improved use of *Viewports* (ability to split display window into two or four):
     - Copy model and attributes between sub-windows
     - Plotting, printing and saving to clipboard all viewports
     - Viewports may be rotated/zoomed simultaneously (Synchronous navigation)
   - Visualization of material types
   - Scaling principal stress vectors with value
   - Several commands only available through line-mode are now also available in menus/GUI:
     - Reduce time reading model by skipping beam cross sectional data
     - Set width of beam drawn as line (not expanded)
     - Switch principal stress vector component P1, P2 and P3 on/off
     - Control animation speed
   - Radically improved GUI for adding elements to set
   - Expanding beams available as button
   - Impoved sizing of the dot that indicate a result labels position

4.5.1 Patran-Pre Idealiser

1) **-Support for MSC.Patran 2005 r2 implemented**
2) **-Net scantlings according to Final Rule revision of CSR-Tank implemented**
3) **-Material properties (density and modulus of elasticity) for steel according to Final Rule revisionof CSR-Tank implemented.**